

## 14. Centre for Molecular & Human Genetics

1. Name of the Department : Centre for Genomics, Molecular & Human Genetics
2. Year of establishment : 2003
3. Is the Department part of a School/Faculty of the university?: Yes, the Department is a part of faculty of the University
4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D. Sc., D.Litt., etc.) : PG and Ph.D.
5. Interdisciplinary programmes and departments involved: Forensic Sciences (P G Diploma)
6. Courses in collaboration with other universities, industries, foreign institutions, etc. : NA
7. Details of programmes discontinued, if any, with reasons: NO
8. Examination System: Annual/Semester/Trimester/Choice Based Credit System: Semester
9. Participation of the department in the courses offered by other departments: None
10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others): None

	<b>Sanctioned</b>	<b>Filled</b>	<b>Actual (including CAS &amp; MPS)</b>
Professor	NIL	NIL	NA
Associate Professors	NIL	NIL	NA
Asst. Professors	NIL	NIL	NA
Others	NIL	NIL	NA

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D./ M.Phil. students guided for the last 4 years
Prof. P.K. Tiwari	Professor in Zoology; Coordinator, School of Studies in Neuroscience and PG Diploma in Forensic Science	Cell and Molecular biology, Human Genetics	30	PhD=04 (Awarded); 01 (Submitted); M.Phil=04

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors:

- a. Dr. Rajnikant Mishra, Banaras Hindu University, Varanasi.
- b. Dr. R.K. Tripathi, CDRI, Lucknow.
- c. Dr. Rajiv Goswami, Barakatullah University, Bhopal.
- d. Prof. Suraksha Agrawal, SGPGI, Lucknow
- e. Prof. J.K. Roy, BHU, Varanasi
- f. Dr. Arundhati Sharma, AIIMS, New Delhi
- g. Dr. Reema Dada, AIIMS, New Delhi
- h. Prof. I. K. Patro, Jiwaji University, Gwalior
- i. Dr. B. R. Shrivastava, CHRI, Gwalior
- j. Dr. Veena Agrawal, GRMC, Gwalior
- k. Dr. Rajiv Mishra, Banaras Hindu University, Varanasi.
- l. Dr. Mahmood Ali, FSL, Sagar (Retired Dpty Director)
- m. Dr. M. K. Verma, FSL, Sagar (Rtd. Director)
- n. Dr. Azad Shrivastava, RFSL, Gwalior (Rtd. Dy Director)

13. Percentage of classes taken by temporary faculty – programme-wise information

**M.Sc. Molecular & Human Genetics – 30%**  
**PG Diploma in Forensic Science – 70%**

14. Programme-wise Teacher Student Ratio : MHG - 1:21  
**PGDFS – 1:10**

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual:  
 1 (Class III) + 2 ( Class IV)

16. Research thrust areas as recognized by major funding agencies:

- **Gallbladder Cancer** : Identification of biomarkers, epigenetics study and role of non-coding RNA in disease pathogenesis.
- **Tuberculosis** : Human genome polymorphism in relation to disease susceptibility in tribal populations of central India (M. P. & Chattisgarh).
- **Stress Biology** : Molecular biology of stress (adoptive) responses.
- **Population Genetics of Endangered Reptilians** : Population genetics and conservation genetics, particularly of endangered animal species (e.g., turtles and gharials)

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Ongoing projects from(a) National funding agencies= 03;(b) International= NIL

S.No.	Title of the project	No. of faculty	Funding agency	Total grant	Duration of the project
1.	Study on the epigenetic regulation of subtelomeric region and expression of telomere associated proteins in human gallbladder carcinoma.	01	DAE, Govt. of India, Mumbai (National)	Rs. 19.5 lakhs	03 years (2011-2014)
2.	Methylation profiling of gallbladder cancer and gall stone diseases to identify potential biomarkers for early disease diagnosis.	01	DST, Govt. of India, New Delhi	Rs. 55 lakhs	03 years (2012-2015)
3.	Functional validation of candidate genes in gallbladder cancer for identification of early diagnostic biomarker.	01	MPCST, Govt. of India, Bhopal	Rs. 15.38 lakhs	02 years (2013-2015)

18. Inter-institutional collaborative projects and associated grants received

a) **National collaboration: NIL**

b) **International collaboration: NIL**

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

Funding agency	Total grant
DAE, Govt. of India, Mumbai	Rs. 19.5 lakhs
DST, Govt. of India, New Delhi	Rs. 55 lakhs
MPCST, Govt. of India, Bhopal	Rs. 15.38 lakhs

20. Research facility / centre with

- ✓
  - **state recognition**
  - **national recognition**
  - **international recognition**

21. Special research laboratories sponsored by / created by industry or corporate bodies: NIL

22. Publications: (during last 5 years)

• **Number of papers published in peer reviewed journals (national / international)**

1. Sahasrabuddhe NA, Barbhuiya MA, Bhunia S, Subbannayya T, Gowda H, Advani J, Shrivastav BR, Navani S, Leal P, Roa JC, Chaerkady R, Gupta S, Chatterjee A, Pandey A, Tiwari PK. Identification of Prosaposin and Transgelin as potential biomarkers for gallbladder cancer using quantitative proteomics. *Biochem Biophys Res Commun*. 2014 Mar 2014. PMID: 24657443.
2. Gupta S, Barbhuiya MA, Bhunia S, Kakkar M, Shrivastav BR, Tiwari PK. Fine needle aspiration cytology of lesions of liver and gallbladder: An analysis of 400 consecutive aspirations. *Journal of Cytology*, 2014, 3(1), 20-24.
3. Singh TD, Poojary S, Bhunia S, Barbhuiya MA, Kakkar M, Jalaj V, Gupta S, Shrivastav BR, Tiwari PK. APC is epigenetically downregulated in advance cases of gallbladder cancer. *Molecular Cytogenetics* 2014, 7(Suppl 1):P21 doi:10.1186/1755-8166-7-S1-P21.
4. Mishra G, Kumar N, Kaur G, Tiwari PK, Mehra NK. Distribution of HLA-A, B and DRB1 alleles in Sahariya tribe of North Central India: An association with pulmonary tuberculosis. *Infection Genetics and Evolution* 2013 (ahead of publication). PMID: 23994122.
5. Rawat M, Vijay S, Gupta Y, Tiwari PK, Sharma A. Imperfect duplicate insertions type of mutations in plasmepsin V modulates binding properties of PEXEL motifs of export proteins in Indian *Plasmodium vivax*. *PLoS One*. 2013; 8(3):e60077. doi: 10.1371/journal.pone.0060077.
6. Mishra G, Kumar N, Kaur G, Tiwari PK, Mehra NK. Distribution of HLA-A, B and DRB1 alleles in Sahariya tribe of North Central India: An association with pulmonary tuberculosis. *Infection Genetics and Evolution* 2013 (ahead of publication). PMID: 23994122.
7. Barbhuiya MA, Singh TD, Poojary S, Jalaj V, Kakkar M, Gupta S, Shrivastav BR, Tiwari PK. Gallbladder cancer incidence in Gwalior district of India: five year registry of a Regional Cancer Centre. *Indian J Cancer*; 2014 (In Press).
8. Singh TD, Barbhuiya MA, Poojary Satish, Shrivastav BR and Tiwari PK. The Liver Function Test Enzymes and Higher Glucose Level are Positively Correlated in Gallbladder Cancer from North Central India: A Cancer Registry Data analysis. *Indian J Cancer* 2012; 49: 125-36.
9. Singh TD, Sharma P, Gupta R, Barbhuiya MA, Poojary S, Shrivastav BR, Tiwari PK (2012). Methylation patterns of *MASPIN* and *STRATIFIN* genes in Gall Bladder Cancer and Gall Stone Diseases. *J Cancer Res Therapeut*. 2012; 8 (5): 1-46 (supplement Pp65).
10. Nandini AS, Mustafa AB, Pawar H, Singh TD, Subbannaya T, Harsha HC, Shrivastav BR, Chaerkady R, Tiwari PK, Pandey A. Identification of potential biomarkers for gallbladder cancer using a quantitative proteomic approach. *J Cancer Res Therapeut*. 2012; 8 (5): 1-46

(supplement Pp31).

11. Mishra G, Poojary S, Sharma PR, Tiwari PK. Genetic polymorphisms of *CCL2*, *CCL5*, *CCR2* and *CCR5* genes in Sahariya tribe of North Central India: An association study with pulmonary tuberculosis. *Infection Genetics and Evolution* 2012; 112 (5): 1120-1127.
12. Barbhuiya MA, Sahasrabudhe NA, Pinto S, Muthuswamy B, Singh TD, Nanjappa V, Keethikumar S, Delanghe B, Harsha HC, Chaerkady R, Gupta S, Shrivastav BR, Tiwari PK and Pandey A. Comprehensive proteomic analysis of human bile. *Proteomics* 2011; 11: 4443-53.
13. Singh TD, Barbhuiya MA, Jalaj V, Agrawal N, Gupta S, Shrivastav BR and Tiwari PK. Quantitative Assessment of Expression of Lactate Dehydrogenase and its Isoforms 3 and 4 May Serve as Useful Indicators of Progression of Gallbladder Cancer: A Pilot Study. *Ind J Clin Biochem* 2011; 26 (2): 146-153.
14. Sharma PR, Singh S, Jena M, Mishra G, Prakash R, Das PK, Bamezai RN, Tiwari PK. Coding and non-coding polymorphisms in VDR gene and susceptibility to pulmonary tuberculosis in tribes, castes and Muslims of Central India. *Infect Genet Evol* 2011; 11: 1456-61.
15. Rawat M, Vijay S, Gupta Y, Dixit R, Tiwari PK and Sharma A. Sequence homology and structural analysis of plasmepsin 4 isolated from Indian *Plasmodium vivax* isolates. *Infect Genet Evol* 2011;11: 924-33.
16. Vinod, Tiwari P.K. and G.P. Meshram Evaluation of mutagenic and antimutagenic activities of neem (*Azadirachta indica*) seed oil in the *in vitro* Ames *Salmonella*/microsome assay and *in vivo* mouse bone marrow micronucleus test. *J Ethnopharmacology* 2011; 134: 931-937.
17. Singh TD, Barbhuiya MA, Gupta S, Shrivastav BR, Jalaj V, Agarwal N and Tiwari PK (2011). Quantitative Assessment of Expression of Lactate Dehydrogenase and its Isoforms 3 and 4 may Serve as Useful Indicators of Progression of Gallbladder Cancer: A Pilot Study. *Ind J Clin Biochem* 26(2):146–153.
18. Reddy PVJ and Tiwari PK (2011). Genomic structure and sequence analysis of *Lucilia cuprina* HSP90 gene. *Cell Mol Bio* 57 (1): 106-115.
19. Rohilla MS, Reddy PVJ, Sharma S and Tiwari PK (2011). In Vitro Induction of the ubiquitous HSP 60 and 70 KD heat shock proteins, by pesticides monocrotophos and endosulphan in *Musca domestica*: A potential biomarker of toxicity. *Cell Mol Bio* 57 (1): 94-105.\
20. Vinod V, Tiwari PK and Meshram GP (2011). Evaluation of mutagenic and antimutagenic activities of neem (*Azadirachta indica*) seedoilinthe *in vitro* Ames *Salmonella*/microsome assayand *in vivo* mouse bonemarrowmicronucleustest. *J Ethnopharm.* (doi:10.1016/j.jep.2011.02.003).
21. Sharma PR, Singh S, Jena M, Mishra G, Prakash R, Das PK, Bamezai RNK and Tiwari PK (2011). Coding and non-coding polymorphisms in VDR gene and susceptibility to pulmonary tuberculosis in tribes, castes and Muslims of Central India. *Infec Gene Evol.* (doi:10.1016/j.meegid.2011.05.019).
22. Barbhuiya MA, Sahasrabuddhe NA, Pinto SM, Muthusamy B, Singh TD, Nanjappa V, Keerthikumar S, Delanghe B, Harsha HC, Chaerkady R, Jalaj V, Gupta S, Shrivastav BR, Tiwari PK and Pandey A (2011). Comprehensive proteomic analysis of human bile. *Proteomics* 2011; 11 (23): 4443-53.
23. Sharma PR, Jain S, Bamezai RNK and Tiwari PK (2010). Utility of serum LDH and its isoforms in

the assessment of *Mycobacterium tuberculosis* induced pathology in TB patients of Sahariya tribe. *Ind J Clin Biochem* 25: 57-63.

24. Sharma PR, Jain S, Bamezai RNK and Tiwari PK (2010). Increased prevalence of pulmonary tuberculosis in male adults of Sahariya tribe of Central India: A revised survey. *Ind J Comm Med* 35: 267-271.
25. Barbhuiya MA, Singh TD, Gupta S, Srivastav BR, Tiwari PK (2009). Incidence of gall bladder cancer in rural and semi-urban population of north central India: A first insight. *Int. Journal of Epidemiology*, Volume 7 Number 2.
26. Sharma PR, Reddy PVJ, Barbhuiya MA, Mishra G, Tekcham DS, Prakash R, Jain S, Tiwari PK (2009). Poor Health conditions and opportunistic infections among children of Sahariya tribe of Central India: Clinical aspects and risk factors. *Internet J of Pediatrics and Neonatology*. Volume 10 Number 2.
27. Rohilla MS, Rao RJ, Tiwari PK (2009). Enzyme polymorphism in Indian freshwater soft shell turtle *Lissemys punctata*. *Acta Herpatologica* 4(1): 15-28.
28. Swarkar S, Ekta R, Prithvi RS, Mamta J, Shweta S, Katayoon Darvishi, Audesh K Bhatt, AJS Bhanwer, Tiwari PK, Bamezai RNK (2009). The Indian origin of paternal haplogroup R1a1\* substantiate the autochthonous origin of Brahmins and the caste system. *Journal of Human Genetics* 54, 47-55. (Nature publishing group).

* Monographs	:	<b>NIL</b>
* Chapters in Books	:	<b>02</b>
* Edited Books	:	<b>NIL</b>
* Books with ISBN with details of publishers	:	<b>NIL</b>
* Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)		
* Citation Index- range/average	:	<b>02 and 1.5 (average)</b>
* SNIP	:	
* SJR	:	
* Impact factor- range/average	:	02 and 1.5 (average)
* h-index	:	8

23. Details of patents and income generated : NIL
24. Areas of consultancy and income generated : NIL
25. Faculty selected nationally / internationally to visit other laboratories / institutions  
**a. industries in India and abroad** : *NIL*
26. Faculty serving in  
**p) National committees b) International committees c) Editorial Boards d) any other (please specify): NA**

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops training programs and similar programs). NIL
28. Student projects ( batches from 2009- 2014)
- percentage of students who have done in-house projects including inter-departmental projects : 58.33%
  - percentage of students doing projects in collaboration with other universities
    1. industry / institute = 41.67%
29. Awards / recognitions received at the national and international level by
- Faculty : DBT Overseas Associateship
  - Doctoral / post doctoral fellows: Young Scientist Award, MPCST -04  
INSPIRE fellowship, DST-01  
JSPS HOPE fellow -01
  - Students: NIL
30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any. ( during last 5 years)
- 5<sup>th</sup> Hands on training Workshop on “Methods in Molecular Analysis of Complex Diseases” from 20<sup>th</sup> February to 10<sup>th</sup> March 2012, at Centre for Genomics, School of Studies in Zoology, Jiwaji University, Gwalior, M.P.  
**Funded by: Department of Biotechnology, Government of India, New Delhi.**
  - *National Seminar on “Tribal Health and Genomics” from 19<sup>th</sup> March to 21<sup>st</sup> March 2012 at Centre for Genomics, School of Studies in Zoology, Jiwaji University, Gwalior, M.P.*  
**Funded by: ICMR & CSIR, New Delhi and MPCST, Bhopal.**
31. Code of ethics for research followed by the departments:  
All the research programs are been carried after clearance from institutional human ethical committee (as per ICMR guidelines)
32. Student profile programme-wise:

Name of the program	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
2009-2011	10	01	08	100%	100%
2010-2012	16	05	01	100%	100%
2011-2013	19	03	03	100%	90%
2012-2014	37	09	01	Ongoing	Ongoing
2013-2015	31	05	07	Ongoing	Ongoing

33. Diversity of students:

Name of the Programme (refer to question no.4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
PG (2009-2011)	35%	35%	20%	10%
2010-2012	30%	10%	60%	NIL
2011-2013	40%	40%	20%	NIL
2012-2014	40%	NIL	60%	NIL
2013-2015	20%	NIL	80%	NIL
Ph.D. (pursuing)	90%	10%	NIL	NIL

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise. (Last 5 years)

- **CSIR-NET : 02**
- **GATE : 01**

Percentage of faculty who are graduates	
of the same university	NIL
from other universities within the State	NIL
from universities from other States	100%
from universities outside the country	NIL

35. Student progression

Student progression	Percentage against enrolled
UG to PG	NA
PG to M.Phil.	NA
PG to Ph. D.	43%
Ph.D. to Post-Doctoral	80%
Employed	
• Campus Selection	NIL
• Other than campus selection	20%
Entrepreneurs	10%

36. Diversity of staff

37. D.Sc. and D.Litt. during the assessment period: NA

38. Present details of departmental infrastructural facilities with regard to

***/ Library : Yes, with more than 300 books and research journals***

***/ Internet facilities for staff and students: Available***

***/ Total number of class rooms : 03***



/ Class rooms with ICT facility: 03

/ Students' laboratories: 02

/ Research laboratories: 02

39. List of doctoral, post-doctoral students and Research Associates (from 2009-2014)

***/ from the host institution/university :***

1. Doctoral students : **02 (awarded)+ 01(submitted)  
+05(registered)+03(unregistered)**
2. Post-doctoral student : **NIL**
3. Research Associate : **NIL**

***/ from other institutions/universities***

1. Doctoral students : **NIL**
2. Post-doctoral student : **NIL**
3. Research Associate : **NIL**

40. Number of post graduate students getting financial assistance from the university ((from 2009-2014)): NIL

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology. NIL

42. Does the department obtain feedback from

- i. Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The subject curriculum is evaluated and recommended by the board of studies duly constituted by the university and time to time open house discussion with the students on teaching and training program being conducted in the department. The problems expressed by the students are solved accordingly by the concerned faculty.

- ii. Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

One of the members of the board of studies of the subject is a M.Sc. student representing the ongoing batch, who provides feedback on the content of the syllabus and teaching methods for further improvement.

- iii. Alumni and employers on the programmes offered and how does the department utilize the feedback?

In view of the competitiveness of the subject and the course and placement /job opportunities the suggestions provided by the alumni are utilized for further improvement of the curriculum.

43. List the distinguished alumni of the department (maximum 10):

Most of the students are currently, either working as research fellows or post doctoral, in reputed institutions in India and abroad. A few of them are employed on managerial or technical positions in R & D divisions of biotechnology and pharmaceutical industries in India and abroad.

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving

external experts.

We organize lectures, seminars, talks etc. by inviting external faculties from various renowned Universities and research institutes, who encourage the students to pursue their successful career in the field of research and job prospects.

45. List the teaching methods adopted by the faculty for different programmes.

The teaching methods include, apart from blackboard and whiteboard teaching, PowerPoint presentations and on line subject materials (e.g. bioinformatics).

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

Assessment of the performance of students is done by taking their internal exams, seminars and assignments on topics related to the curriculum as well as the upcoming areas of research in the subject.

47. Highlight the participation of students and faculty in extension activities. NIL

48. Give details of “beyond syllabus scholarly activities” of the department.

The students participate and present posters in popular science exhibitions and science fair organized by the Government scientific agencies.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. NA

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The major research programs of the department include,

- Epidemiology and genetics of tuberculosis in tribal populations from central India (including M.P., Rajasthan & U.P.), highly endemic for the disease as well as the non tribal neighbouring population, with a view to develop diagnostic and therapeutic markers.
- In view of the high incidence gallbladder cancer in the central Indian region the department has undertaken detailed investigation on the epidemiology, molecular genetics and biomarker evaluation in order to develop diagnostic, prognostic and therapeutic markers using novel genomic technologies.
- The department has initiated molecular diagnosis of genetic disorders with a view to establish a regional facility for genetic diagnosis and counselling.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges

**(SWOC) of the department.**

- a. Strengths :** **Well-equipped research laboratory**  
Well trained research students  
Well furnished infrastructure  
Good library  
Internet facility

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- b. Weakness : Inadequate faculty**  
No proper staff for administrative work
- c. Opportunities : Well trained students in advance genomic technologies that makes them competitive from any other reputed lab.**  
Department has got research funding from various Government funding agencies which has facilitated advanced research in the field of genomics.  
The availability of advanced research facilities and expertise has made the teaching program highly competitive.  
The training of students has led to their placement, not only in highly reputed Universities and Research Institutes, but also in biotechnology, pharmaceuticals and diagnostic companies.
- d. Challenges : Being a self supporting department, it does not receives any financial support from the University, which could provide an impetus to the department for faster growth. In addition, lack of regular faculty remains a major challenge with regard to teaching and research. Hence, requires an early action on the appointment of regular faculty to strengthen the academic and research base of the department.**

52. Future plans of the department.

Up-gradation of research and teaching facilities, newer areas of research to be introduced, efforts will be made for the appointment of more regular / full-time teachers, etc.